

## ABSTRACT

An InP based NPN heterojunction bipolar transistor (HBT) having an emitter mesa; a base layer; an emitter ledge layer located above the base layer and below the emitter mesa, the emitter ledge layer having an intrinsic region located beneath the emitter mesa and an extrinsic region located outside the intrinsic region, the extrinsic region made of depleted semiconductor material; and base contacts formed within a portion of the extrinsic region of the emitter ledge layer and spaced at selected distances from the emitter mesa, wherein the base contacts electrically contact the base layer, and wherein the base contacts and the emitter ledge layer are disposed to cover an upper surface of the base layer so that there are no gaps in the emitter ledge layer between the base contacts and the emitter mesa to leave the upper surface of the base layer exposed.